Fig. 1

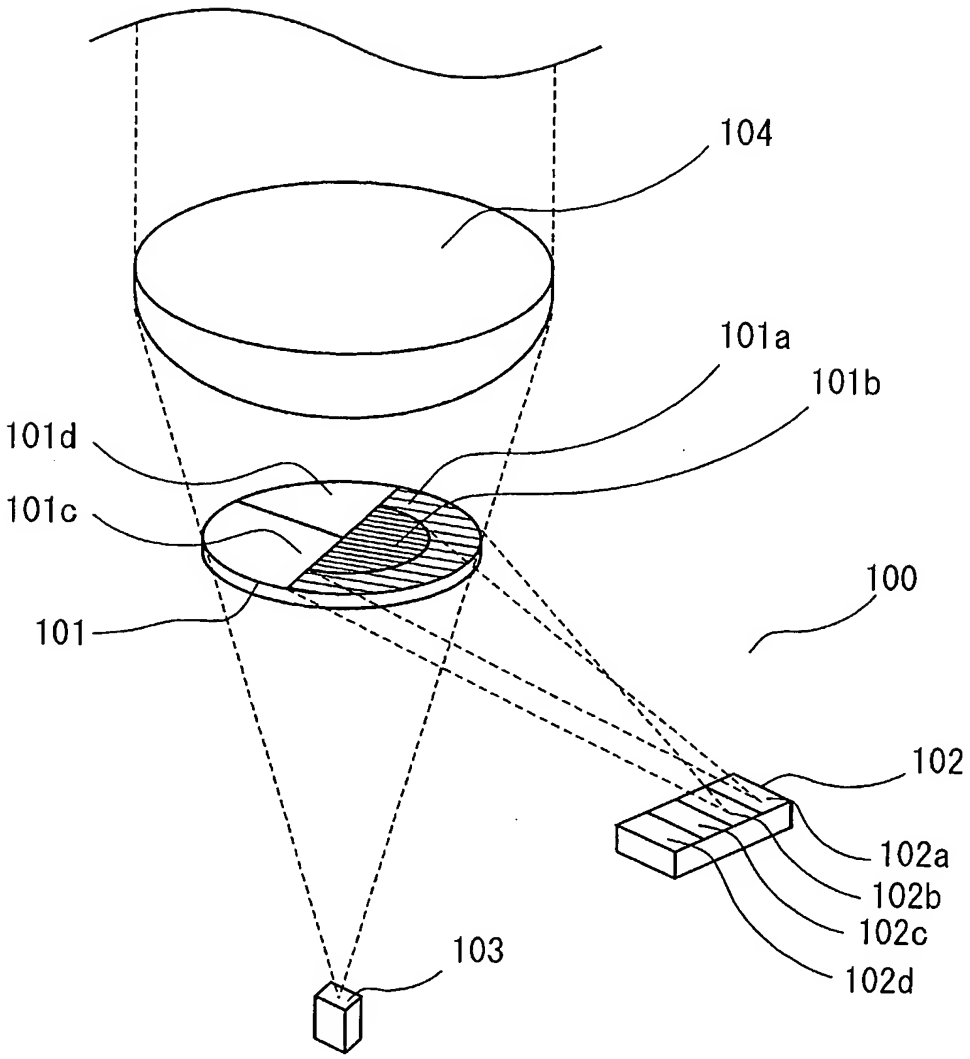


Fig. 2

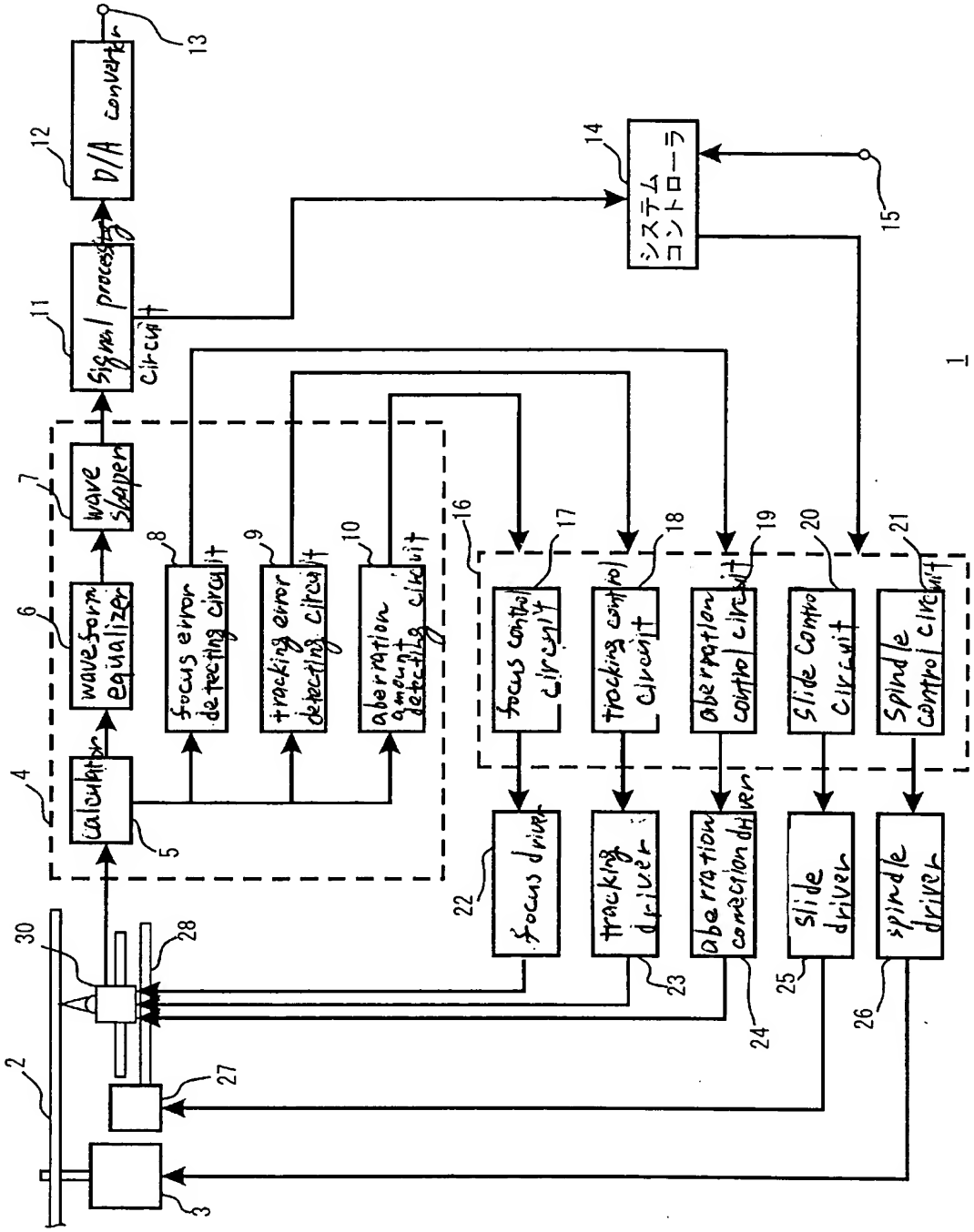

D/A converter
12
13
14
システム コントローラ
15
Signal process circuit
11
wave shaper
7
waveform equalizer
6
calculator
4
5
focus error detecting circuit
8
tracking error detecting circuit
9
aberration amount detecting circuit
10
16
focus control circuit
17
tracking control circuit
18
aberration control circuit
19
Slide control circuit
20
Spindle control circuit
21
focus driver
22
tracking driver
23
aberration correction driver
24
Slide driver
25
spindle driver
26
1
2
3
27
28
30

Fig. 3

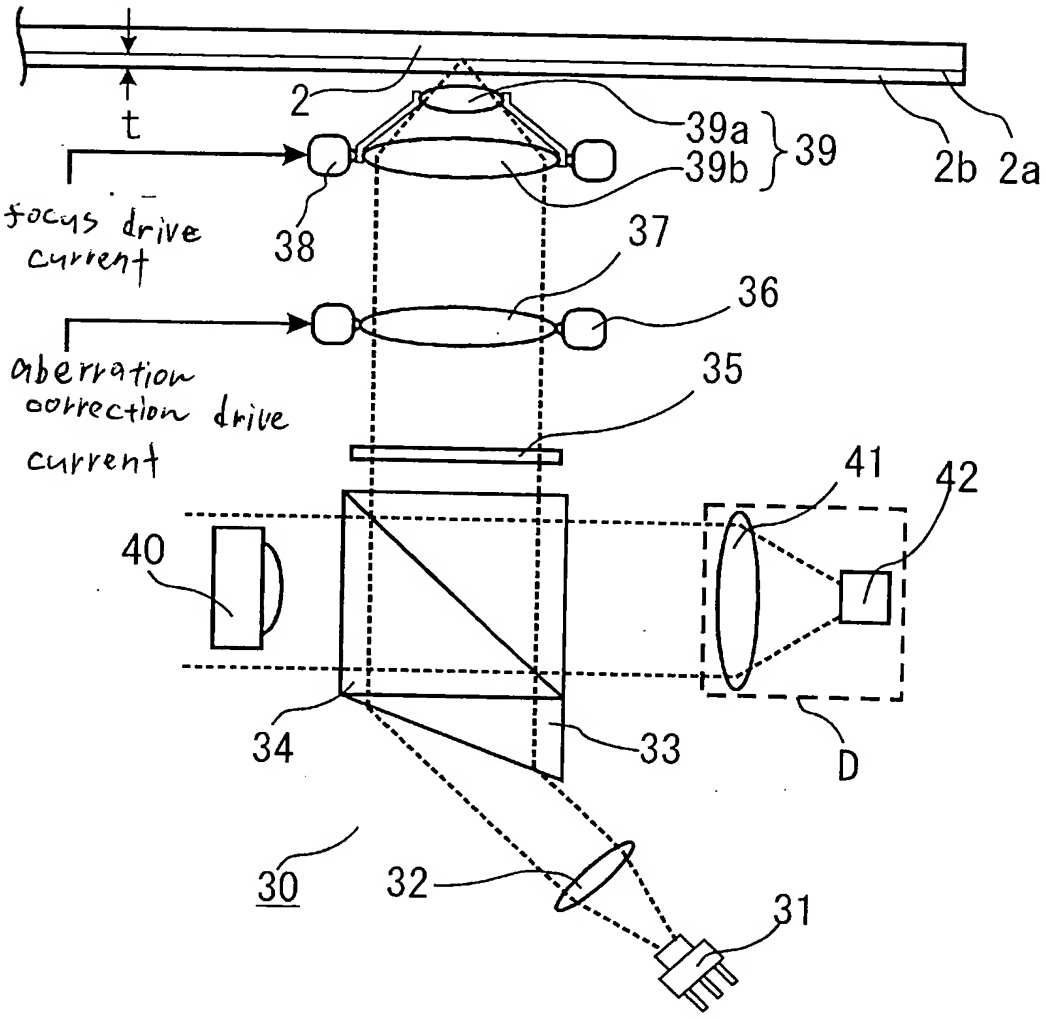

t
2
39a
39b
39
2b
2a
focus drive current
38
37
36
aberration correction drive current
35
41
42
40
34
33
D
30
32
31

Fig.4

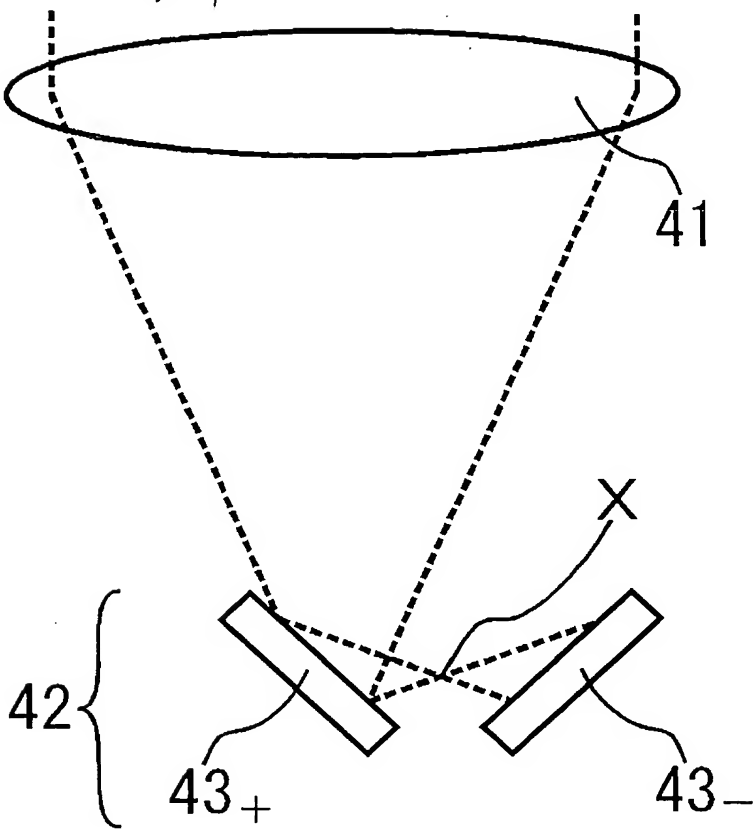


Fig. 5

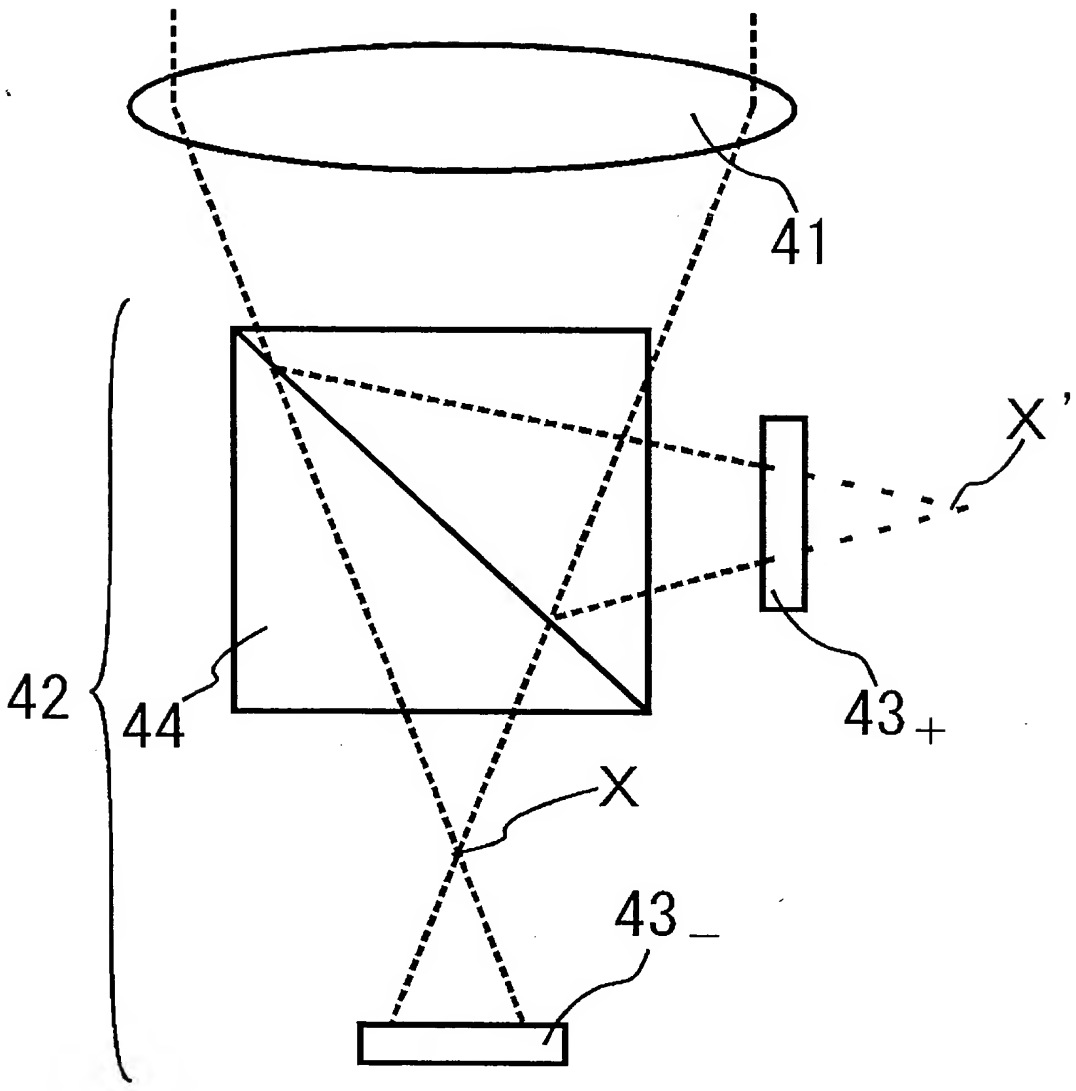


Fig. 6

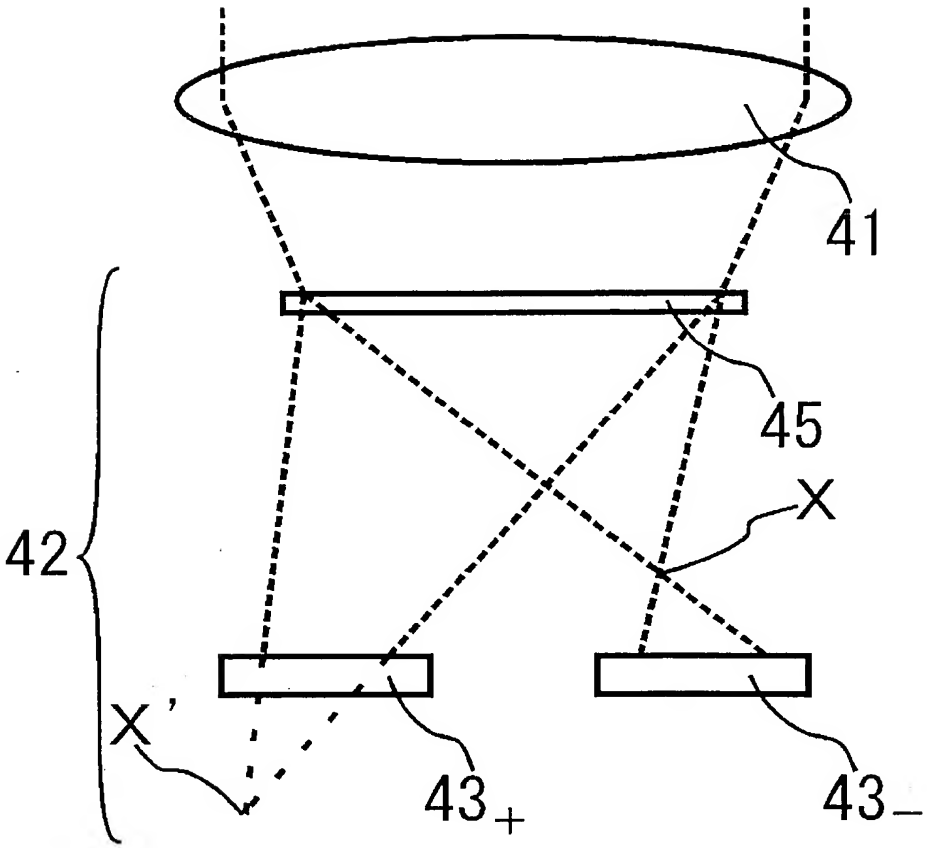


Fig. 7

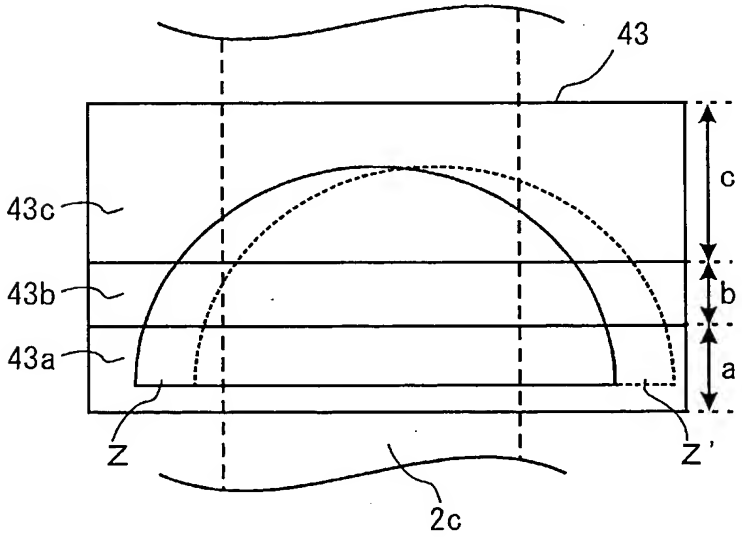
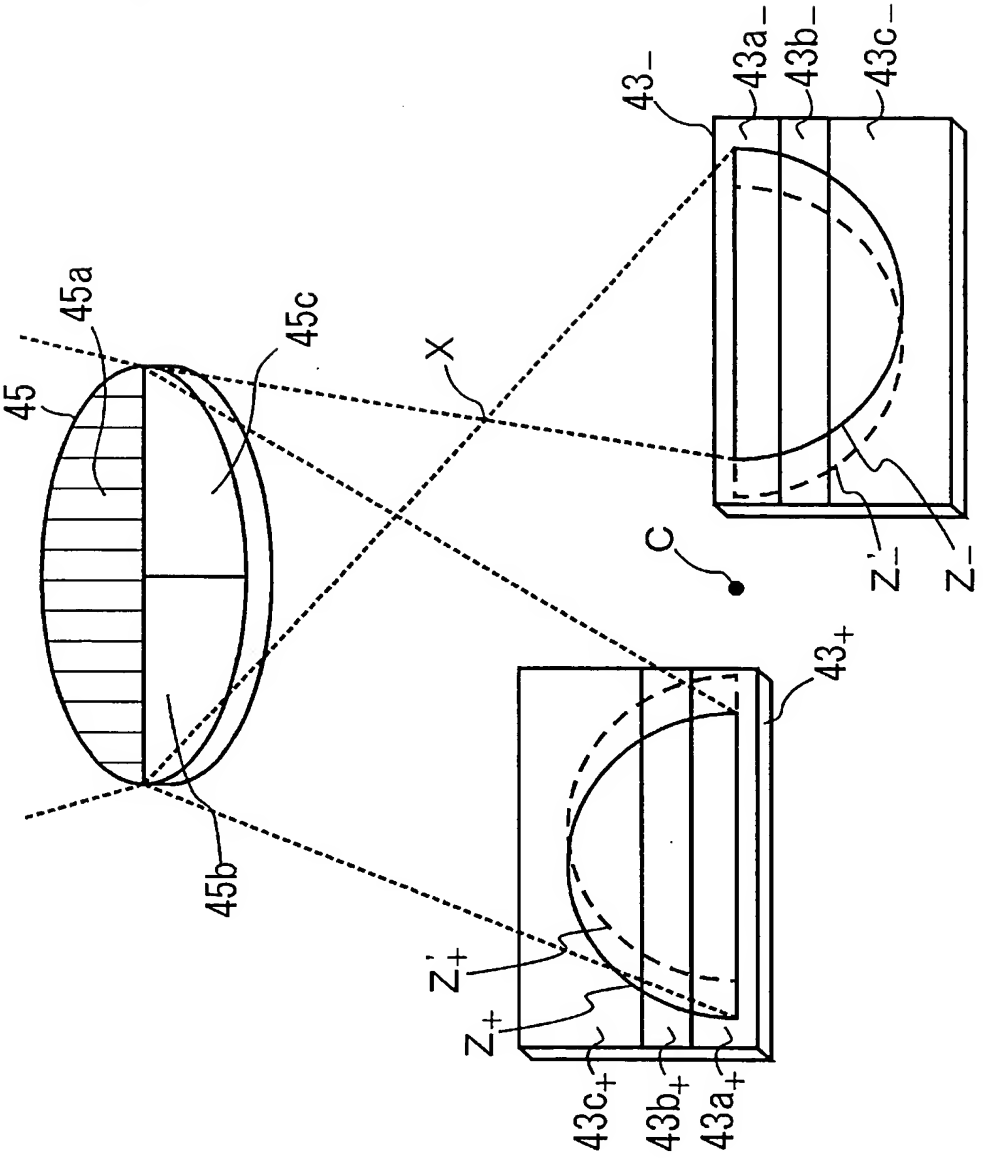


Fig. 8



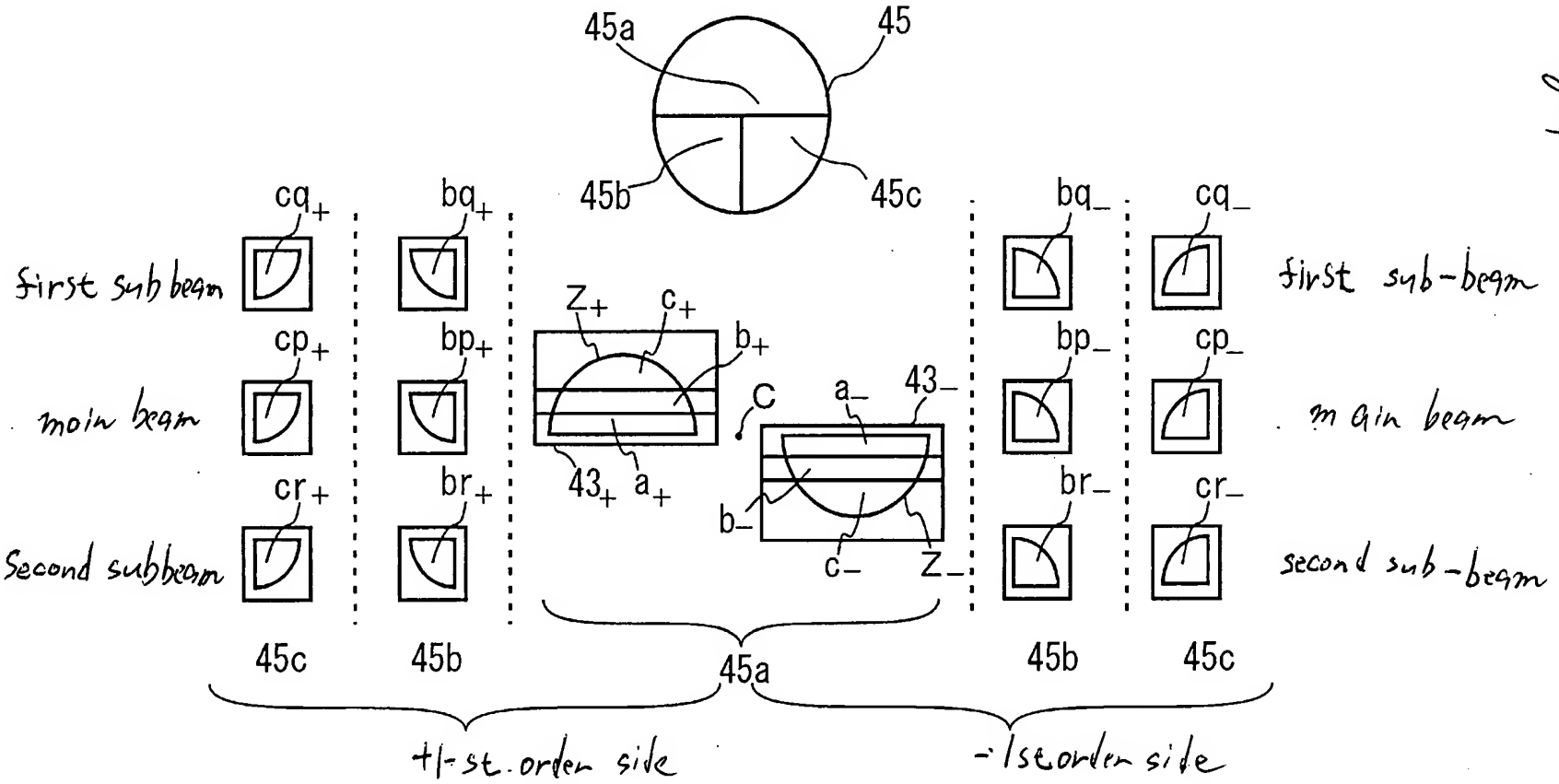


Fig. 9

Fig.10

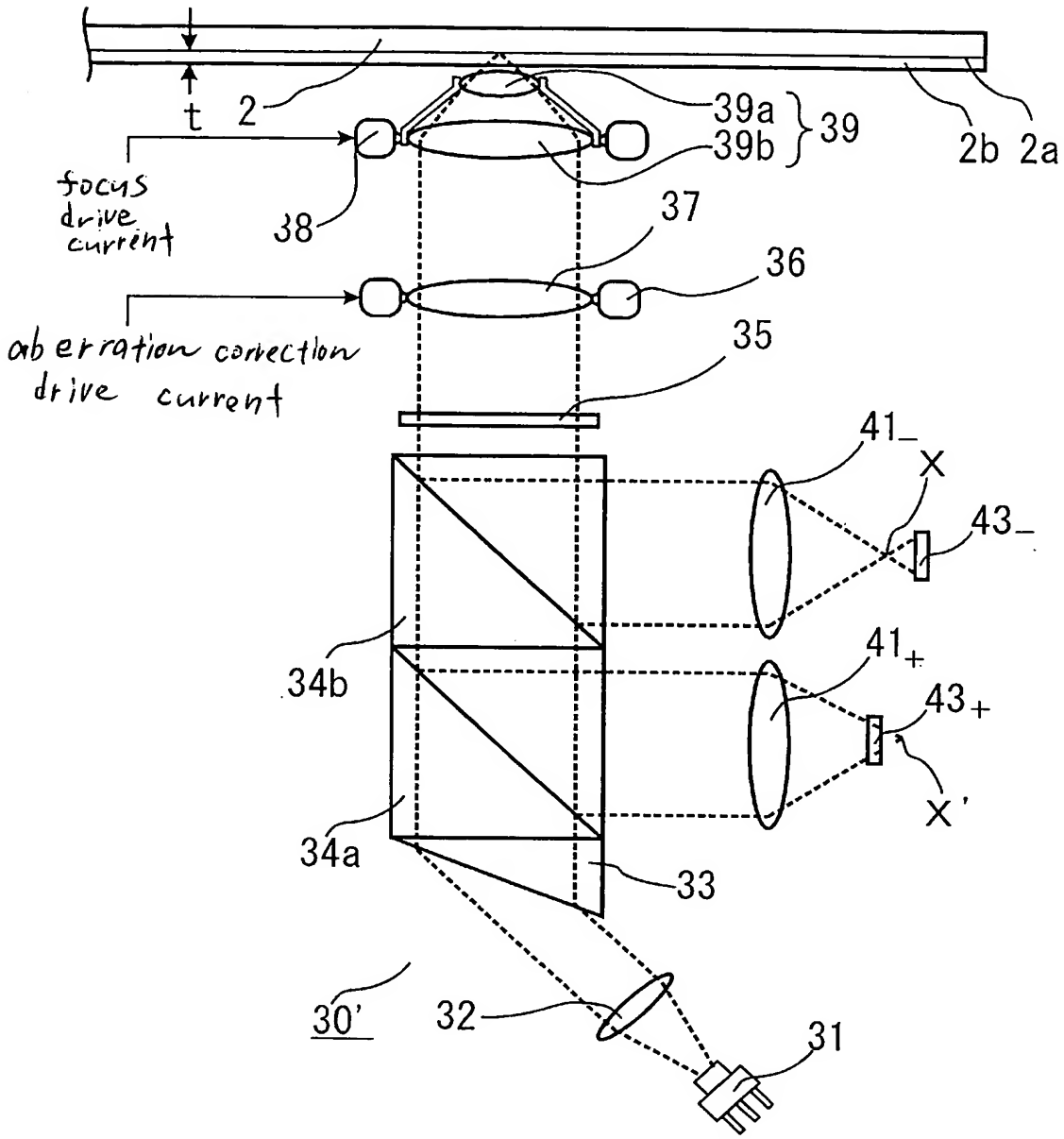

t
2
39a
39b
39
2b
2a
focus drive current
38
37
36
aberration correction drive current
35
41_
X
43_
34b
41+
43+
X'
34a
33
30'
32
31

Fig. 11

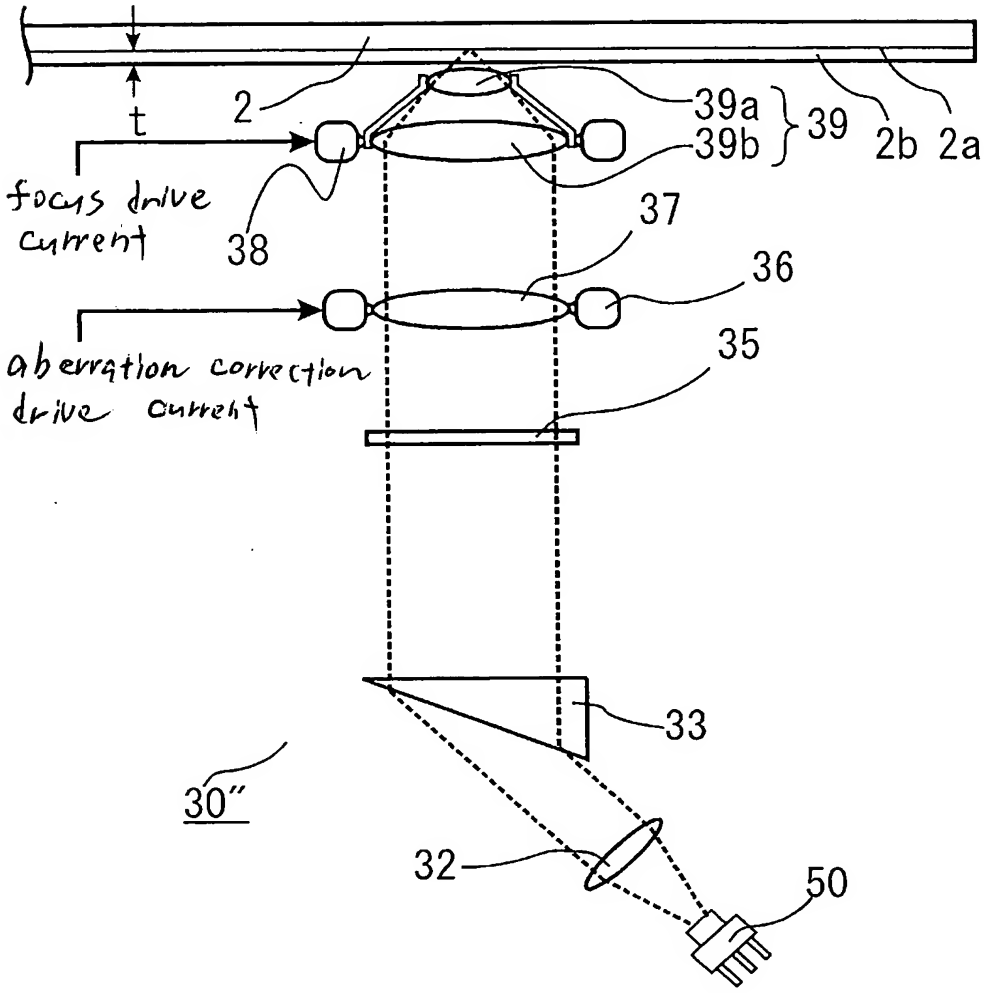

t
2
39a
39b
39
2b
2a
focus drive current
38
37
36
aberration correction drive current
35
33
30"
32
50

Fig. 12

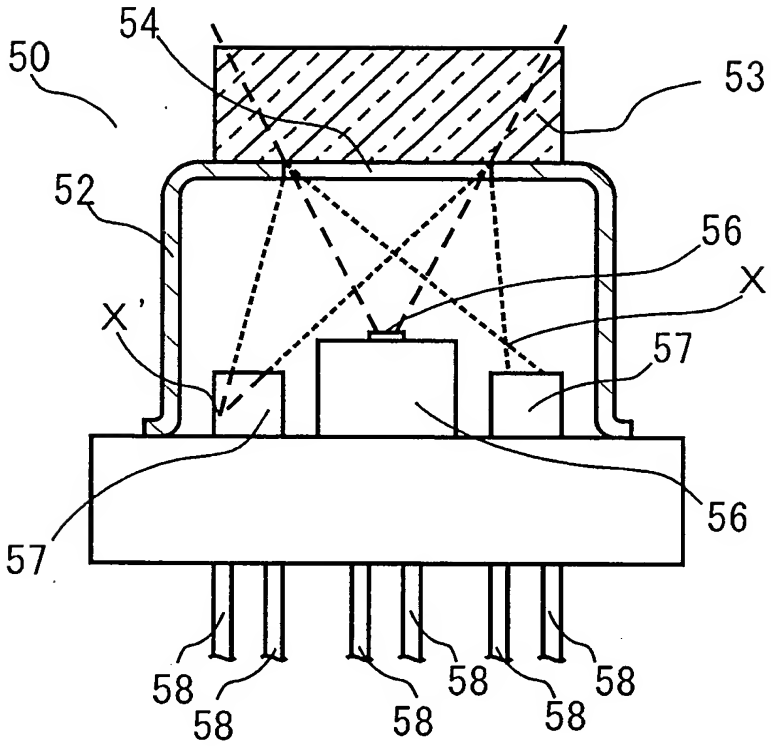
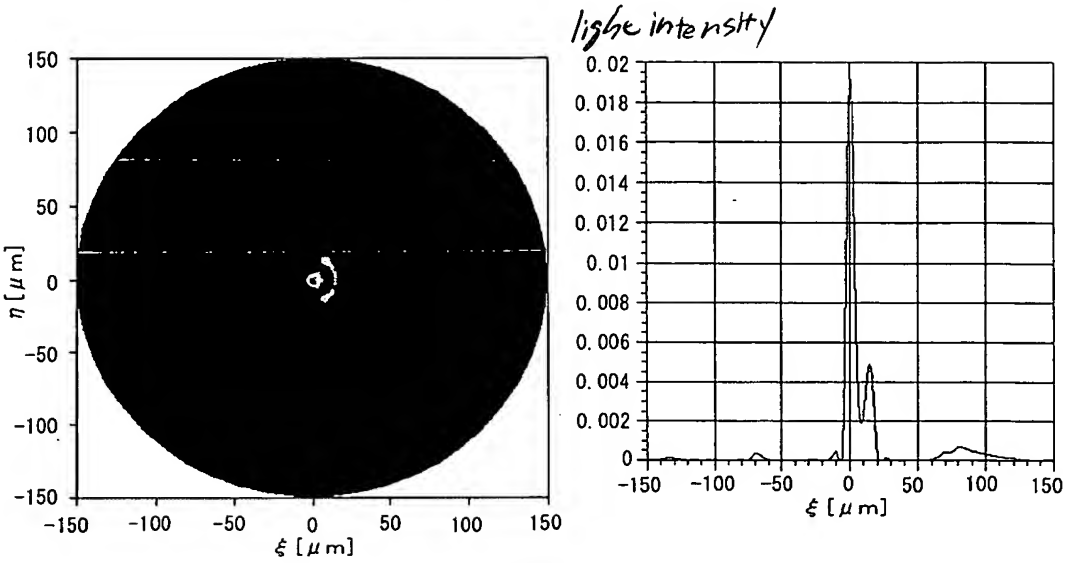
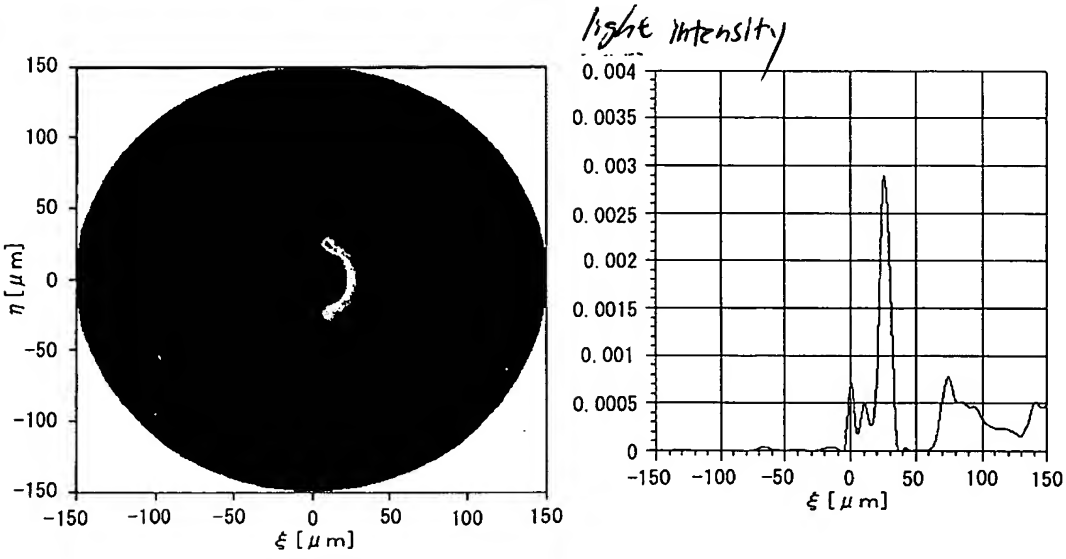


Fig. 13

A


light intensity
150
100
50
0
-50
-100
-150
η [μm]
-150 -100 -50 0 50 100 150
ξ [μm]
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
-150 -100 -50 0 50 100 150
ξ [μm]

B


light intensity
150
100
50
0
-50
-100
-150
η [μm]
-150 -100 -50 0 50 100 150
ξ [μm]
0.004
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
-150 -100 -50 0 50 100 150
ξ [μm]

C

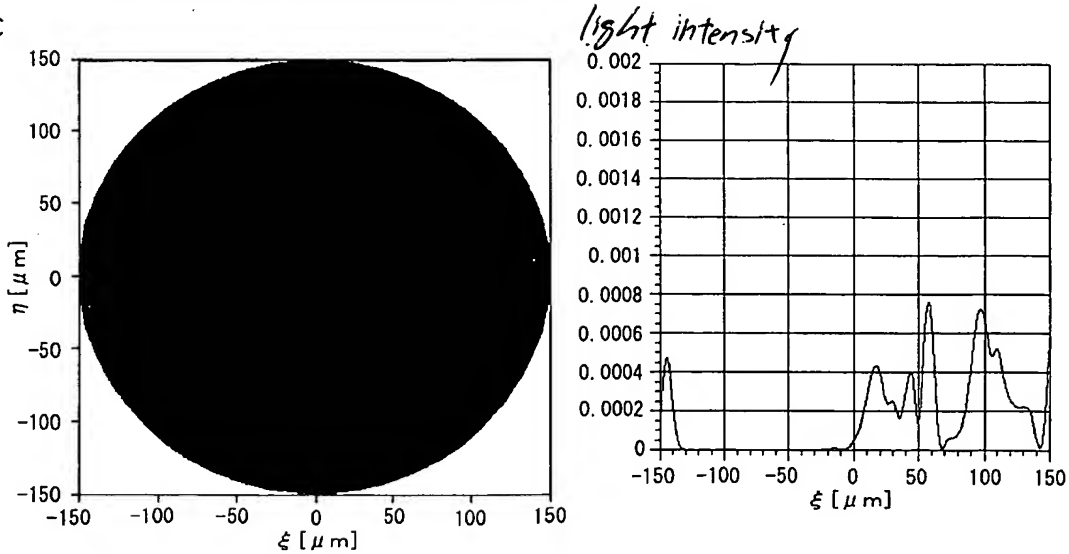
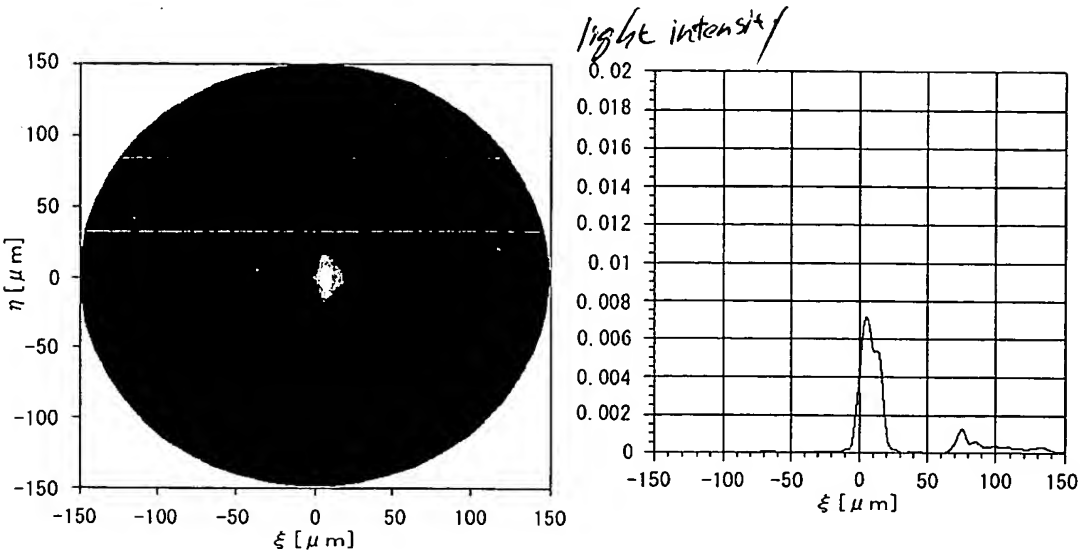
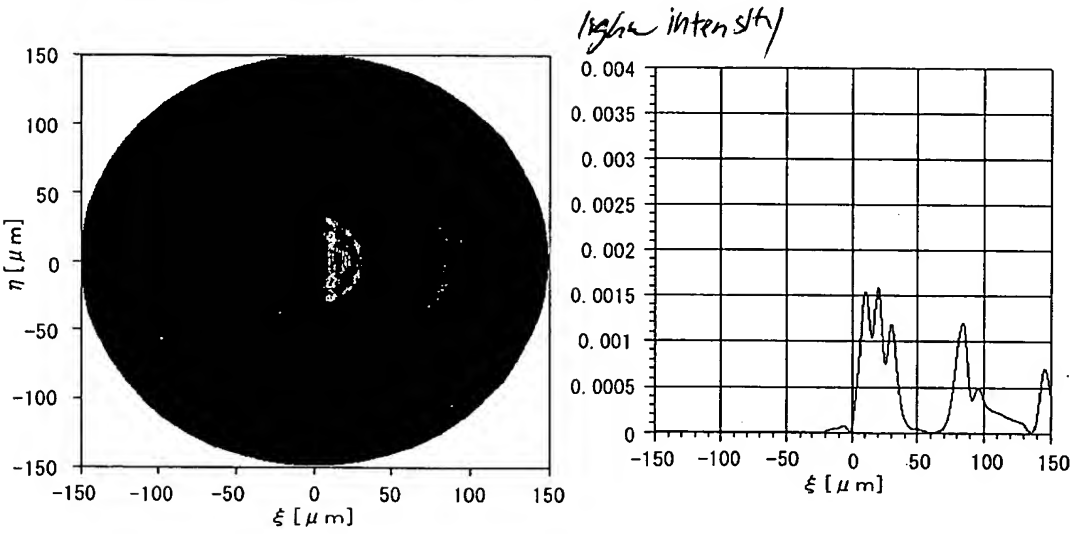

light intensity
150
100
50
0
-50
-100
-150
η [μm]
-150 -100 -50 0 50 100 150
ξ [μm]
0.002
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
-150 -100 -50 0 50 100 150
ξ [μm]

Fig. 14

A


light intensity
150
100
50
0
-50
-100
-150
η [μm]
-150 -100 -50 0 50 100 150
ξ [μm]
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0

B


light intensity
150
100
50
0
-50
-100
-150
η [μm]
-150 -100 -50 0 50 100 150
ξ [μm]
0.004
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0

C

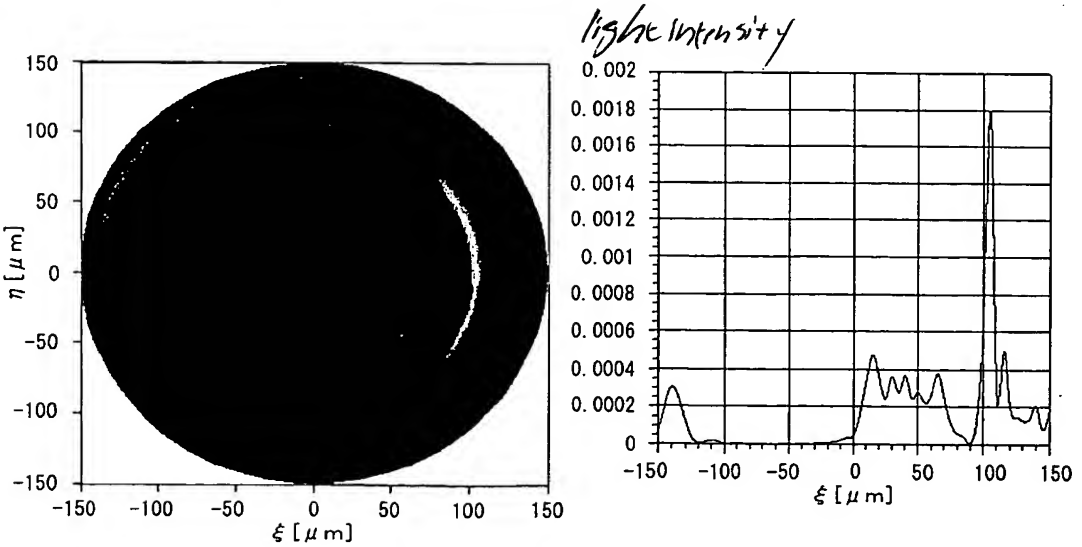
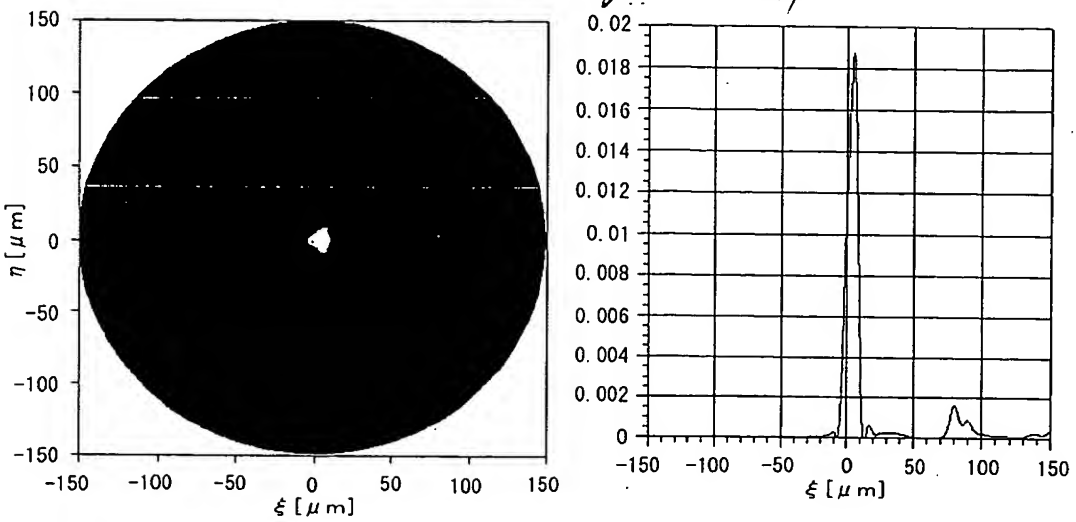
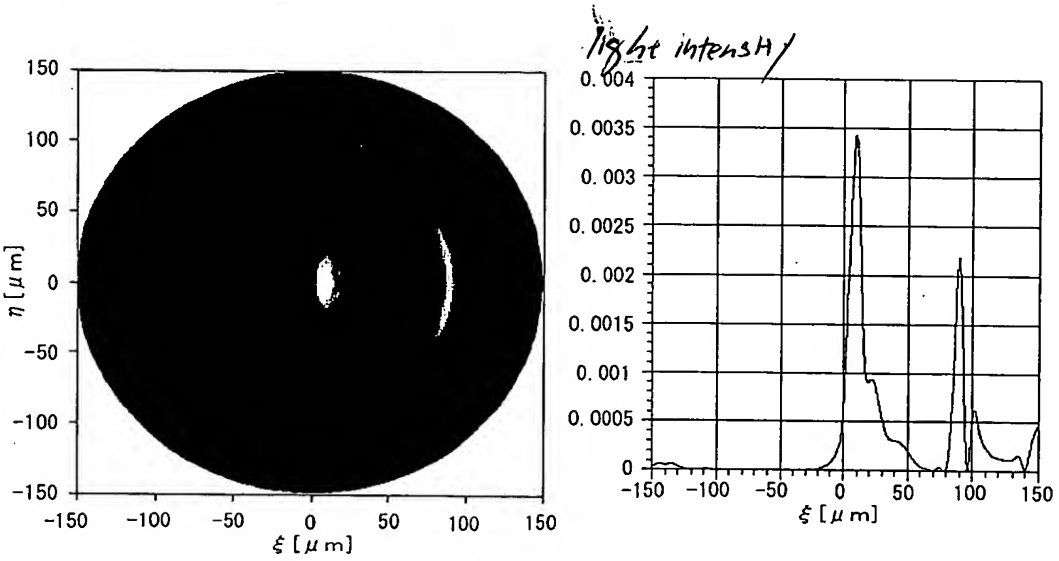

light intensity
150
100
50
0
-50
-100
-150
η [μm]
-150 -100 -50 0 50 100 150
ξ [μm]
0.002
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0

Fig. 15

A


light intensity
150
100
50
0
-50
-100
-150
η [μm]
-150 -100 -50 0 50 100 150
ξ [μm]
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
-150 -100 -50 0 50 100 150
ξ [μm]

B


light intensity
150
100
50
0
-50
-100
-150
η [μm]
-150 -100 -50 0 50 100 150
ξ [μm]
0.004
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
-150 -100 -50 0 50 100 150
ξ [μm]

C

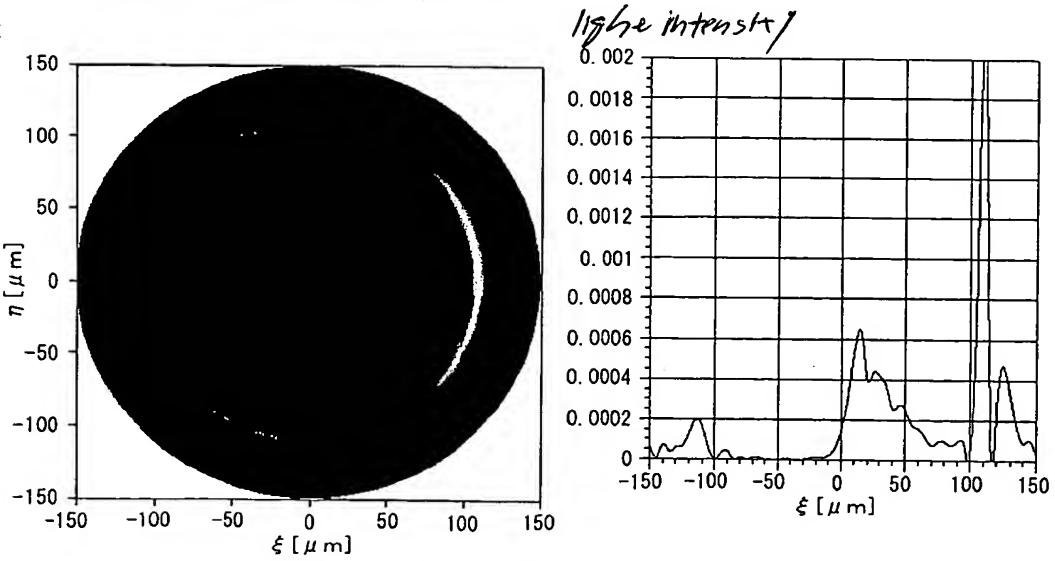

light intensity
150
100
50
0
-50
-100
-150
η [μm]
-150 -100 -50 0 50 100 150
ξ [μm]
0.002
0.0018
0.0016
0.0014
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
-150 -100 -50 0 50 100 150
ξ [μm]

Fig. 16

protecting layer thickness error dependency of the following formulae

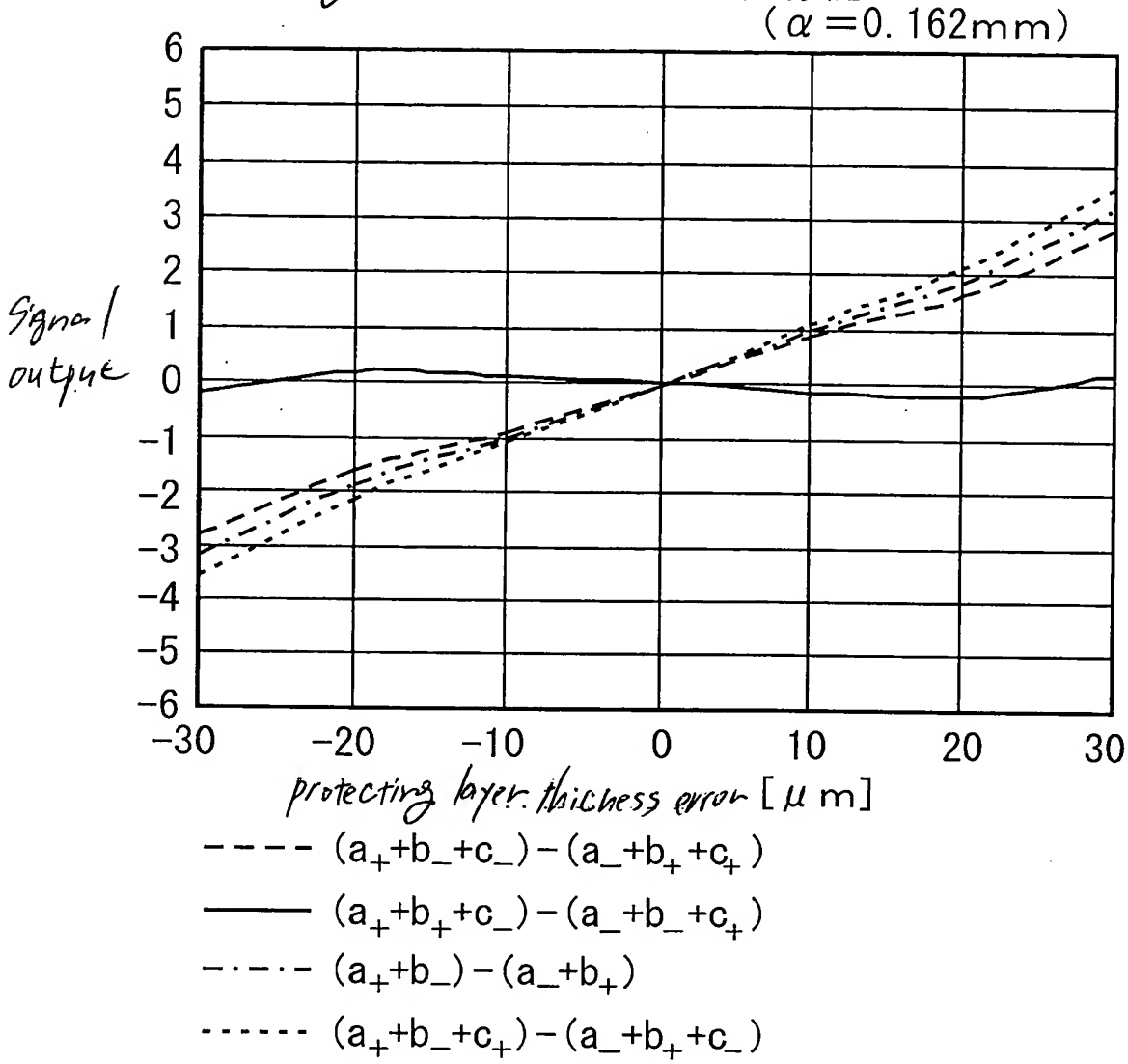


Fig.17

protecting layer thickness error dependacy of the following formulae.

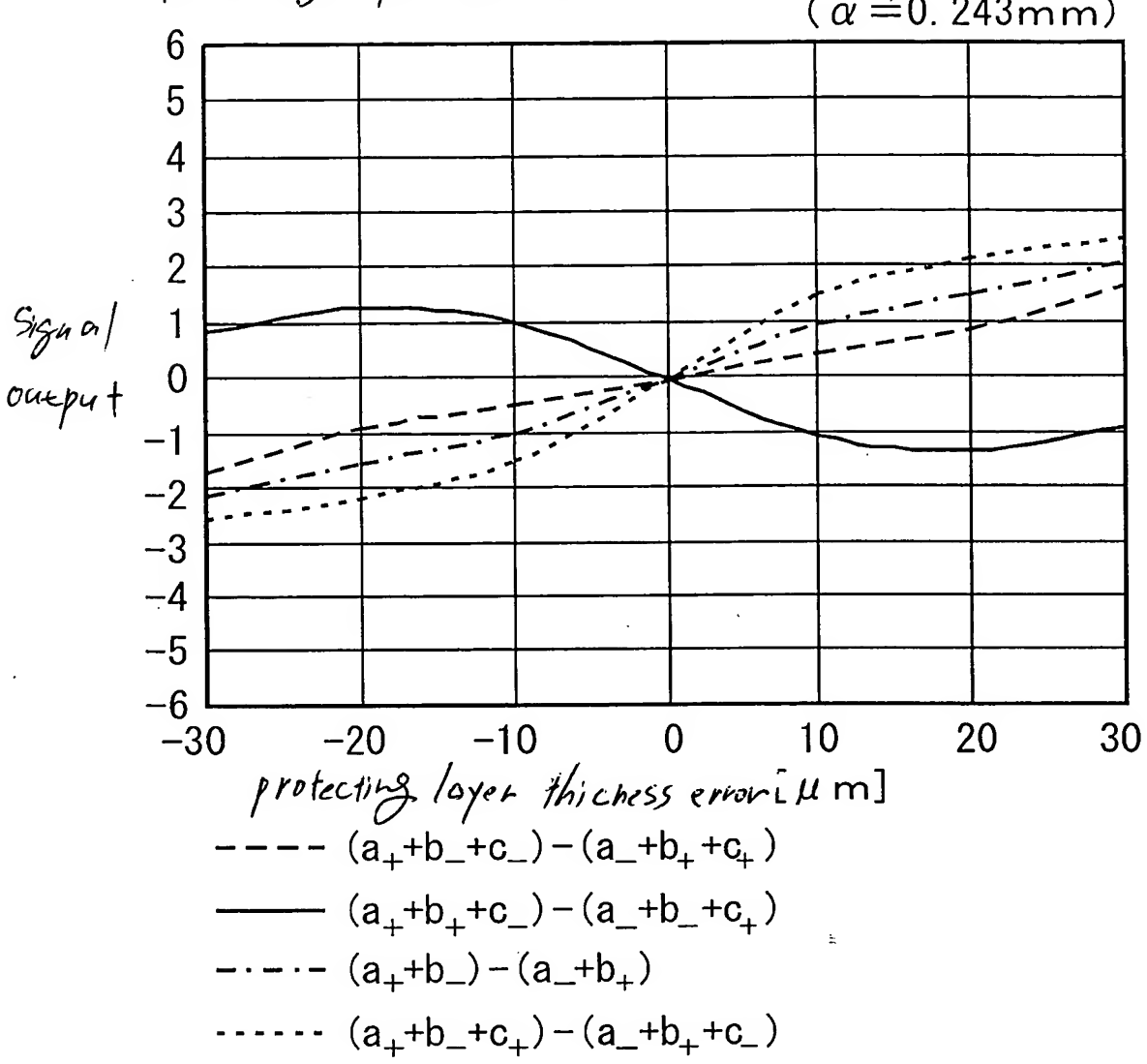


Fig. 18

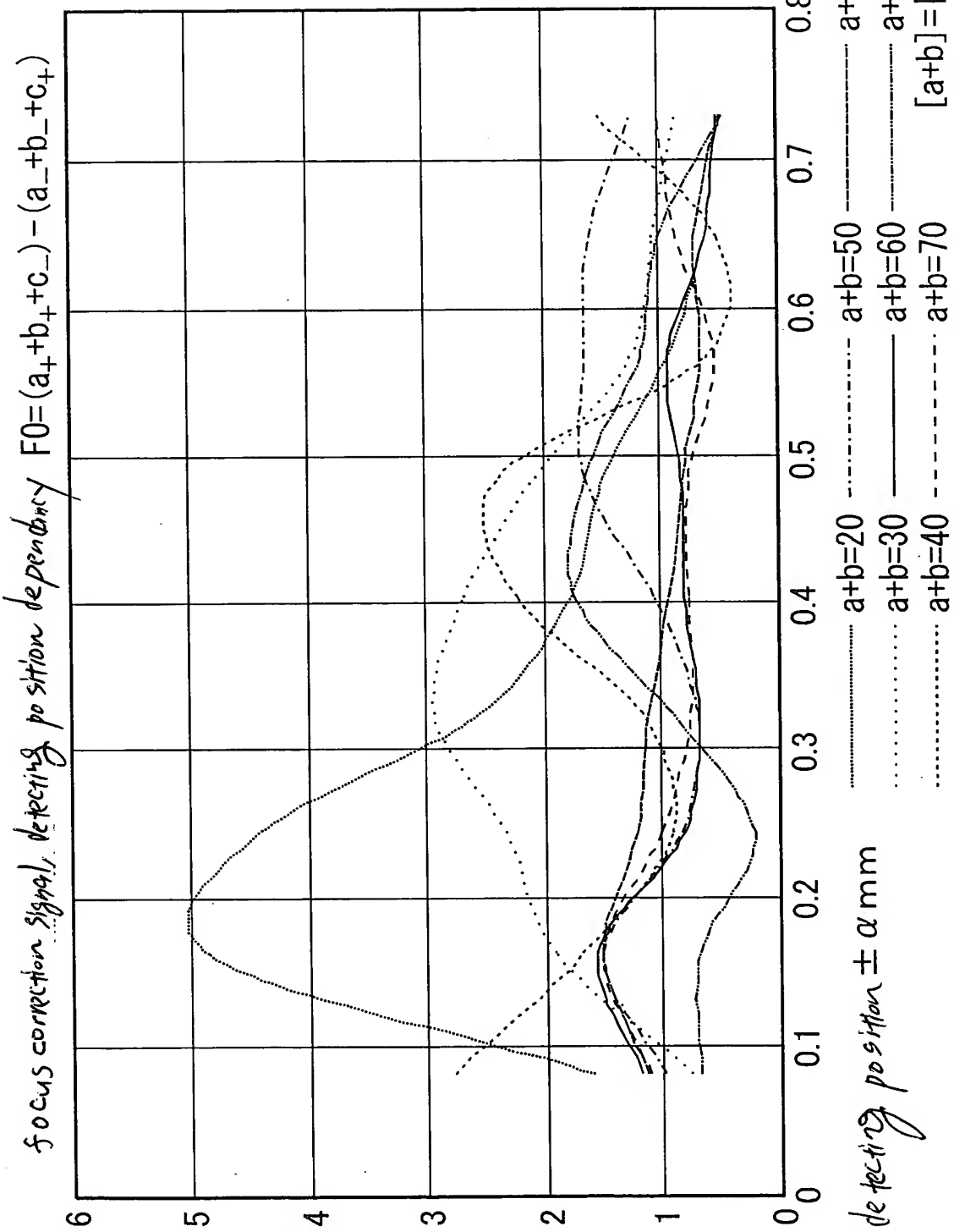
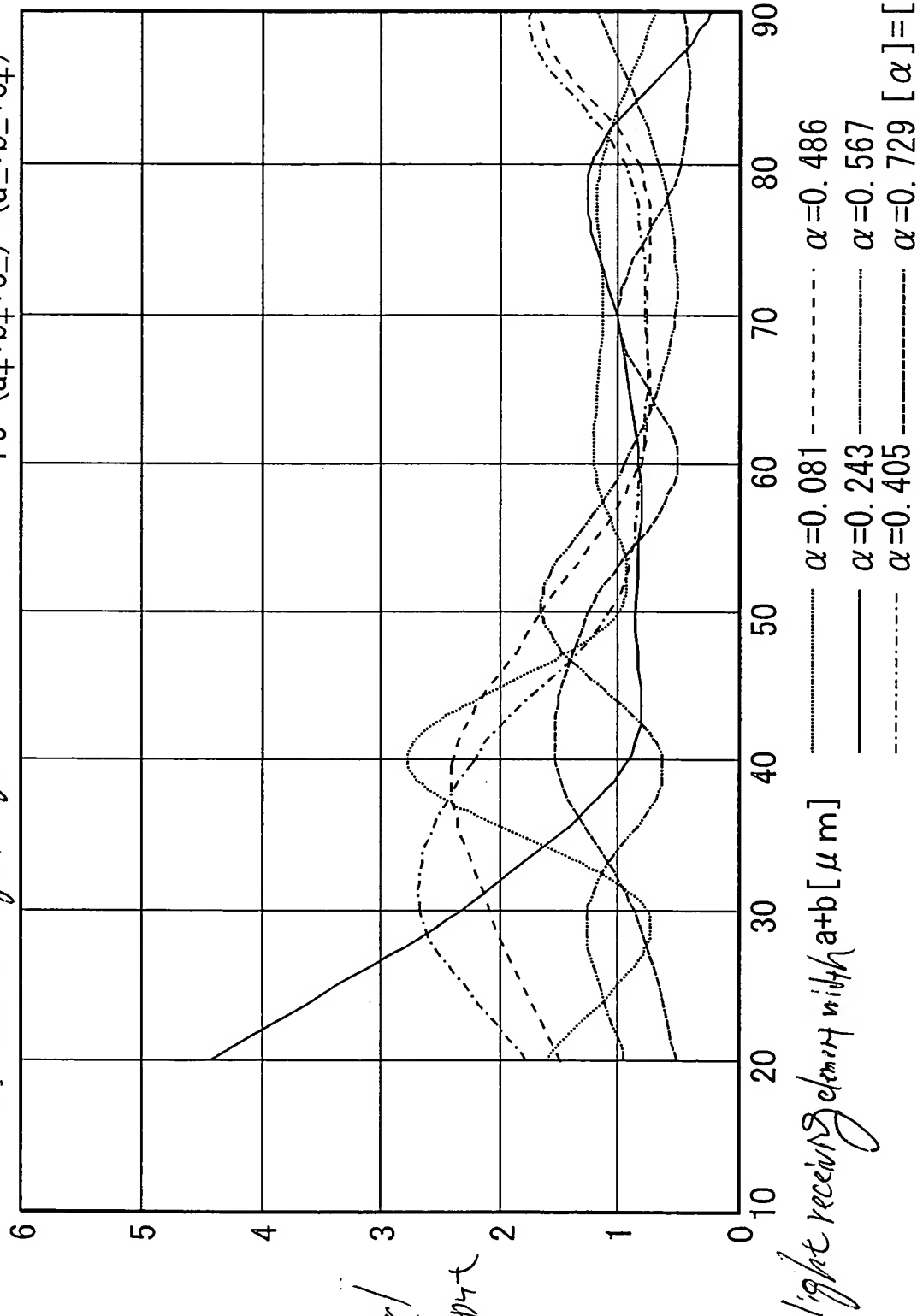

focus correction signal detecting position dependency FO=(a+ +b+ +c−)−(a− +b− +c+)
Signal output
0
1
2
3
4
5
6
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
detecting position ± α mm
a+b=20
a+b=30
a+b=40
a+b=50
a+b=60
a+b=70
a+b=80
a+b=90
[a+b]=[μm]

Fig. 19


focus correction signal light receiving element width dependency
FO=(a+ +b+ +c+)−(a− +b− +c−)
Signal output
0
1
2
3
4
5
6
10
20
30
40
50
60
70
80
90
light receiving element width a+b [μm]
α=0.081
α=0.243
α=0.405
α=0.486
α=0.567
α=0.729 [α]=[μm]